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JANUARY 1941

Volume II. Number 1.

DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

PUBLISHED MONTHLY for the PHYSICIAN in the GENERAL PRACTICE of MEDICINE

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VOL. II JANUARY 1941 No. 1

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800 AVENUE B., GALVESTON, TEXAS

BUSINESS OFFICES
PHYSICIANS POSTGRADUATE PRESS
500 NORTH DEARBORN ST., CHICAGO, ILLINOIS

PRINTING OFFICES
ALAMOGORDO ROAD, EL PASO, TEXAS

DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Medical
Dept
4-8-42
453 I
Vol. 1-2

EDITORIAL COMMENT

The Youngest Medical Problem: Old Age

Today, more than ever before, interest has turned to those persons reaching senescence. This is, perhaps, the natural result of previous medical achievements, which have tended to diminish the mortality rate in infancy and the earlier decades of life, thus allowing more people to reach old age. The age range of our population has shown a pronounced shift to the bracket above sixty within the past few years, and there is every indication of a further swing in that direction.

Hence an important problem has arisen, whose ramifications extend into the various constituents of our social structure. That a study of the complexities of aging, or gerontology, has social, economic, and political aspects, in addition to medical features, is well illustrated by recent legislation which takes cognizance of this ever-growing problem.

Specific interest in the diseases of old age, geriatrics, has been less belated. For many years medical practice had been directed to treatment of special structural changes that were considered characteristic for senescence. The chief object was to make the "declining years" livable. The physician and the layman have held an identical view of this phenomenon: that old age was an inevitable state of physical and mental decline, leading to the formation of fixed ideas, lost drives and ambitions, childishness, or on to physical decay and mental deterioration.

Fortunately, necessity is changing this impression and has stimulated research in every field concerned with the biology of life. In certain diseases of the aged, progress is being made in respect to methods of care and prevention. This question of immediate welfare deserves much of our attention, but of more importance is the ability to keep people productive above sixty years of age so that they will constitute an asset rather than a burden.

In the next, or February, number of the Journal there will appear a group of articles, every one of which will deal with some phase of the subject. We have been fortunate enough to obtain the papers presented before the Massachusetts Society for Research in Psychiatry, where the problems of the aged were discussed. These articles give a general idea of some of the methods of approach utilized in the study of abnormalities of the nervous system. The investigations vary from the social and psychological to the physiological (psychometry and electroencephalography), the pathological, the biochemical (vitamins), and include the actual details of administration and regulation of the care of the aged.

Attention is called to this special issue of the Journal dealing with this important subject.

Titus H. Harris, M.D.

Galveston, Texas.

Neuropsychiatry in General Medicine*

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Jacksonville, Illinois

Dr. Norbury graduated from Harvard Medical School in 1917. He served as interne in the Boston City Hospital, then entered the Army, where he was Chief of Laboratory Service, Base Hospital No. 7, A.E.F. After discharge he came to the Norbury Sanatorium where he was Associate Physician from 1919 to 1939, becoming Medical Director after the death of his father, Dr. Frank P. Norbury. He is a Diplomate of the American Board of Psychiatry and Neurology, a member of various medical societies, and a Colonel in the Medical Reserve Corps.

The subject of neuropsychiatry in general medicine covers a lot of territory. If I were to enumerate the phases that one might see you would think that those of us especially interested in disorders of the nervous system were not only covering the medical field, but encroaching upon the territory of the surgeon, of the obstetrician and of many of the specialties. Such a belief might have some justification from two standpoints. The first is the important attitude of thinking of the individual as a whole, of the total personality which includes mental and physical make-up. The second is a corollary to the first. The nervous system is the integrator of the body. Its receptors of different sorts make our contacts with our environment, its effectors cause us to respond to stimuli from without and within, its association centers correlate various streams of nerve impulses motivating our thoughts, feelings and actions, using action in the broad sense to include behavior as well as strictly muscular action.

If there is any difference in the neuropsychiatric approach to clinical problems, it is largely in an emphasis placed upon the individual who has the illness. It is essential, of course, that the various factors are worked out. It is to my mind worse for us to pass up a serious disorder as "nervousness" than it is to exhaust every means of diagnostic procedure and find the condition a functional nervous one. Valuable time is lost, time that may make the difference as to outcome. A false sense of security is given. A blow to our own self-esteem is dealt in the former situation. On the other hand, for the functional nervous disorder, the very thoroughness and detail of the examination, the positive reassurance that can be given, does much to help allay the patient's fears. It is important that while the procedures are being carried out the physician's attitude is such that undue emphasis is not placed which would serve to center the patient's attention too much on any one thing, either a system of the body being examined or an interpretation of some test.

A few years ago I quoted in another paper[1] some figures from a study by McLean at the outpatient Medical Clinic of the University of Chicago. This clinic resembles closely the average office practice of most physicians. McLean analyzed 100 consecutive admissions to the general medical section. On the face of 100 records:

50 patients had clear cut organic disease (neurotic concomitants if any ignored).
23 patients had questionable organic disease (various functional disorders, colitis and so forth included in this category).
27 patients were clearly to be regarded as neurotic.

Other figures by other authorities range from twenty-five to thirty-five per cent of patients as falling into the functional group. Then, when one adds to this possibly another twenty-five per cent having disorders due to autonomic nervous system imbalance, we see that about half of a general medical practice has some neuropsychiatric phase. That is the justification for the title of this paper. It is this phase of which I wish to speak as regards some illnesses where a neuropsychiatric approach is helpful.

Let me illustrate what I mean by taking up two gastro-intestinal conditions, peptic ulcer and mucous colitis. Disturbance of the autonomic nervous system affecting secretion and motility is generally recognized as the causative factor of the objective findings in these disorders. Clinical history, physical, laboratory and x-ray examinations will give the diagnosis and the objective findings. There is no question that body type, dietary habits, possibly focal infection and many other things tend towards the development of these con-

* Read before the Fulton County Medical Society, Canton, Illinois, March 27, 1940.

ditions. Once they develop all the modern methods of ulcer management or bowel management should be carried out. This management includes an understanding of the patient who has the ulcer or mucous colitis. Such an understanding gives the reason for the disturbance in the autonomic nervous system that produces the vascular spasm in the ulcer bearing area, permitting this portion of the stomach to digest itself, permitting the increased secretion of highly acid gastric juice, permitting the hypermotility and associated pylorospasm that causes the hunger pains. Such an understanding gives the reason for the change in the secretory mechanism of the goblet cells of the large intestine permitting excess mucus to be formed. This mucus forms at times in sufficient amounts to become a cast of a portion of the large bowel. When it is displaced, it acts as an irritant, may cause cramping, may cause the patient to have either too many bowel movements in order to get rid of it, or too few because there is distress each time the bowels move, causing the patient to hold back. This understanding does not come at once in the first interview with the patient. It may take a while to get it. However, when the diagnosis is established and the management program outlined to the patient and the family, facts in the history give a start in that direction. Financial stress, family stress, conflict of any sort is a most important item. Sippy's dictum of physical and mental relaxation and separation from the immediate problems of the environment is a major part of his program of ulcer management or bowel management. Whether you follow Sippy, Smithies, Lenhartz, Alvarez or any other authority you find individualization, recognition of the nervous element and rest stressed as much, if not more than diet and medication.

I have mentioned two digestive disorders, many other examples could be cited. The same principles can be applied to almost any other system of the body including the nervous system. We all can think of circulatory disturbance wherein the nervous element is a factor, such as neurocirculatory asthenia or paroxysmal tachycardia or extra systoles. These latter two are often called by our patients "palpitation." I know of reaction depressions having been brought on in susceptible patients by comment or facial expression of the doctor in reporting blood pressure readings. Personality factors are very important in a child or young person who has rheumatic fever as regards the liability to develop chorea. It is good preventive medicine in these young patients to study the temperamental characteristics and to insist in the unstable ones on an even longer period of rest than in the stable rheumatic fever patient. Salicylates, Fowler's solution, vaccines, fever therapy may one or all be indicated and should be followed out—but along with them recognition of the personality element. Proper management of it means much to the rheumatic patient, both for the active stage and later on for the heart, the nervous system and the patient as a whole.

The field of chest disorders does not at once appear to have as many potential nervous system components as some others. We are prone to think there more of the infections both acute and chronic. Many times, however, I have heard Dr. George Palmer say to my father and to me, "The only difference between your patients and mine is that my patients have tuberculosis too." One of the very best papers I have ever read is one Dr. Palmer asked me to review some years ago on "Emotional Factors in the Care of Tuberculosis." Much of his success lies in his diagnostic acumen and his ability to plan for organized systematized care, in his recognition of personality factors, in his management of this phase of his patients' illnesses. There is a well known relationship between the state of nervous tension and the development of asthmatic attacks in susceptible individuals. I am not prepared to go as far as some psychoanalysts in their interpretation of asthmatic attacks. I do believe, however, that emotional stress can lower the threshold to some allergenic substance so that an attack may occur and know many instances where such was apparently the precipitating cause. Hysterical aphonia is very definitely a conversion neurosis affecting the vocal cords.

When one considers the genito-urinary system one can find as much perhaps as one is looking for. Again it is often a matter of the approach in certain conditions. We may con-

sider nervous polyuria as due to disturbance in posterior pituitary secretion but what is behind that? It may be extreme self-consciousness, showing up as stage fright, apprehension, anxiety or fear. All the pituitrin in the world won't get anywhere in controlling this situation until the emotional factor is worked out. Differences in adjustment to a new environment cause a temporary amenorrhea in about fifteen per cent of apparently normal freshmen girls in a college for women for which I am the medical advisor. Some neurotic married women will develop an extreme anxiety reaction over fear of pregnancy if menstruation is delayed. While a pregnant uterus is the most common abdominal tumor, as many of us recall from catch questions in examinations in medical school, I have seen phantom tumors entirely disappear under such conditions when a careful examination and an equally careful psychologic approach has allayed the patient's fears. On the other hand, there may be a considerable anxiety reaction develop on the part of a man or woman approaching the involutionary period without having fulfilled one biologic reason for being here. This calls for careful handling and explanation of the manner in which the individual has fulfilled other biologic reasons in one way or another, directly or by sublimation, otherwise an agitated depression or an involution melancholia may develop.

The practitioner doing obstetrics has many occasions to utilize, in his knowledge of his patients in their environment, a few psychologic principles. Among these are adequate explanation of normal phenomena, reassurance and recognition of the emotional changes which the prospective or recent mother undergoes. In these days of "planned families" a misadventure in the planning may cause considerable nervous upheaval that needs the doctor's help. Nausea and vomiting of pregnancy is another situation that touches obstetrics, internal medicine, endocrinology and neuropsychiatry. Corpus luteum extract, progesterone, suprarenal cortical substance, glucose intravenously, bromides or phenobarbital all have their place in this condition. Equally, if not more important than any or all of these in the early stage, is in most instances the attempt of the physician to get the patient to adopt a point of view. It is surprising, sometimes amazing, how if one can get a patient to talking, can put across an idea, can get a patient to adopt a normal point of view, symptoms quiet down. All this presupposes, of course, that a toxic state as an outgrowth of the other has not developed. Should such misfortune occur then all the skilled assistance that obstetrician, surgeon or internist can give is required. If after delivery toxic mental symptoms, formerly often called puerperal mania, develop, active therapy is needed. If the woman becomes markedly upset hospitalization in a special institution is usually advisable. The condition is usually one of toxic delirium. One can tell the anxious husband or mother in most instances that if the underlying personality is normal the condition will clear up entirely. The baby should be weaned if this is not already required by force of circumstances and inadequate milk supply. Fluids should be forced. Adequate rest should be secured, not using morphine, however. Morphine has no place in my opinion in any toxic delirium, puerperal or otherwise. Chloral hydrate, paraldehyde or bromides work better with one of the milder barbital products for sleep.

The endocrine system presents many opportunities for use of neuropsychiatry in general medicine. Every good endocrinologist is a psychologist and potentially if not actively a neuropsychiatrist. The use of endocrine products is increasing as more active natural and highly potent synthetic preparations are becoming more available. Mention has been made in discussion of other systems of some conditions that are perhaps fundamentally of endocrine origin. Emotional factors have a great deal to do with activating a potentially toxic thyroid situation. Mental sluggishness is one of the well known accompaniments of myxedema. I have been asked to see two patients with Addison's disease in the past year on account of nervous symptoms and nervous exhaustion which are seen in this condition. The reaction of the diabetic to curtailing his desire for sugars and starches is as important for his future from the education standpoint, as is the regulation of his diet and how many units of insulin to give. The woman in the menopause needs good advice as to her control of nervous symptoms as

much as she does estrogenic substance intramuscularly.

The surgeon operates, the orthopedist takes care of a fracture or applies a cast or brace, the oculist removes a cataract, but it is the general practitioner who refers the patient for some special procedure and who has to care for the patient afterwards. His knowledge of the patient in his or her own circle is the thing that helps this individual through the post-hospitalization period of lessened activity. It is here that many successes or failures so far as future physical and mental health are made. Recognition of personality factors, utilization of simple yet effective aids may make the difference between normal restoration of function and post-operative or post-traumatic invalidism.

The various intoxications deserve mention under the general subject of this paper. Alcoholism, acute and chronic, is the most common. The person who habitually takes too much to drink with disastrous results to himself, his family, his business, certainly has some personality disorder. The resort to alcohol is a symptom of this. It is what we call an escape mechanism. It is an escape from some situation either within the individual, or in the environment which so affects the individual that he feels he either needs a boost, needs the false courage that a drink can give, or needs to drown his sorrows. Any type of treatment or so-called "cure" that does not recognize this or get the patient to recognize it is bound to fail so far as ultimate results are concerned. We think of three stages in the treatment of alcoholism. The first is that of the acute intoxication. It is usually relatively easily handled if we can control the patient in a controlled environment. This usually means hospitalization in marked or prolonged situations. The second covers that period when the cells of the body, especially the cells of the central nervous system still show metabolic changes as a result of alcohol. The third is that of the psychological rehabilitation. The first is usually a matter of a few days time. The second lasts from ten days to three or four weeks. The third is of variable duration. It may take only a short time. It is more likely to be longer and may run into months. All three stages overlap. One can often find by talking with the patient in the first or second stage the reason for alcoholism. Then this information is available for the extremely essential third stage. The same general principle of management applies to other intoxications and addictions, morphine, chloral, the barbital products. For these as well as for alcoholism hospitalization, separation from the environment where the difficulties arose is usually indicated.

So far I have not mentioned diseases of the nervous system itself. Yet everyone doing general medicine sees a large number of patients falling in this group. One of the common symptoms given by patients is that which they call "nervousness." Freeman,[2] in a recent article in the new journal *Diseases of the Nervous System*, which has as a subhead the caption "A practical journal on psychiatry and neurology, published monthly for the physician in general practice," discusses this symptom. He says "It may betray the presence of hyperthyroidism or alcoholism, or paralysis agitans or multiple sclerosis; it may be the principal expression of an involutional depression or an incipient schizophrenic; or it may be the word the patient uses for want of a better term to express a certain state of nervous tension associated with fatigue." This is another way of stating the well known medical fact that nervousness is a symptom, not a disease. Whether it be a symptom of disorder primary in the nervous system, or primary elsewhere it is as important to work out as it is to determine whether pain in the abdomen is due to appendicitis, cholecystitis, renal colic or pelvic inflammation.

Common complaints recited by patients are of neuritis and neuralgia. Recollection of the distribution of the peripheral nerves, both on sensory and motor side, is important in determining whether one is dealing with a true neuritis or neuralgia, or whether the difficulty arises from trauma, arthritis, myositis, or is referred from some underlying viscus when the trunk is involved. A case in point is one recently seen where what the patient described as neuritis in the thigh was really nerve pressure from a carcinoma of the bladder. For a real neuritis, whether due to focal infection, alcohol or some definite deficiency disorder, synthetic vitamin B_1, thiamin chloride, is an extremely valuable addi-

tion to our therapeutic drugs.

Hypertension of the organic type, cerebral arteriosclerosis, cerebral hemorrhage and cerebral thrombosis sometimes separately, more often in combination of two of them, make up an important part of the practice of every physician. While the cause lies in the cardiovascular system the degree of incapacity resulting depends entirely upon the extent of involvement in the brain. Most often, of course, it is motor function that is most disturbed. Some of the patients who are the most difficult to control and who cause the physician most concern are those in whom motor function is relatively little lessened, but whose association centers have been damaged by vascular insult. Memory and judgment defects, circumstantiality with a tendency to tell all they know and much that they don't, overshooting the mark in response to ordinary life stimuli are characteristic of these persons. They tend to blame others for their own inadequacies. They slyly cover up behavior distortions. They are hard to get along with, harder to live with because they either fly into a rage or put up what is to them a very convincing story when one faces them down on behavior reactions or dares to question their sanity. It is surprising when one makes a formal mental examination of such patients how much deep involvement there may be, partially covered by a veneer of superficiality and circumstantiality.

Acute and subacute infections of the nervous system are seen more often in general medicine than elsewhere. The major acute infections are poliomyelitis, meningococcus meningitis (cerebrospinal fever), and encephalitis (sleeping sickness). I have referred in a previous paper[3] to these major infections and in another one[4] to an important minor one, herpes zoster. Suffice it to say that in the general physical examination of an acutely ill person, especially a young person, it is as important to look for neck stiffness, Kernig sign, tremor and reflex changes as it is to look at the throat, listen to the heart and lungs or palpate the abdomen. For herpes zoster, remember that pain following one of the segments of the body is apt to be followed in a few days by the appearance of the typical eruption of "shingles."

Syphilis is by far the most important subacute infection. Tabes, cerebrospinal syphilis and paresis have significant clinical, social and economic relationships for all physicians. Adequate treatment of primary and secondary syphilis, spinal fluid examination of treated cases before discharge are factors in the prevention of neurosyphilis. Should neurosyphilis have developed then even more intensive treatment with tryparsamide and fever therapy is indicated. Results in patients who have not yet suffered deterioration are quite good. If, however, cells of the central nervous system have been destroyed by the spirochete, all that can be hoped for is arrest of the process by fever therapy at the level of present involvement. Once cells of the brain or spinal cord are destroyed by syphilis or anything else, no form of treatment will bring them back. Glial cells, the supporting cells of the nervous system and corresponding to scar tissue elsewhere, take their place. Cerebral or spinal dysfunction, therefore, necessarily follows in proportion to the amount of destruction that has occurred.

There are other disorders that I could mention but I fear that as I indicated in the first paragraph of this paper you already think that neuropsychiatrists claim all types of illnesses as falling in their field. I would not want to do this. I started out as a physiological chemist, did research bacteriology for a while, had training in pathology, have still the opportunity as pathologist to a small but active general hospital to look through a microscope every day or evening and am especially interested in the internal medicine side of neuropsychiatry. My ideas about neuropsychiatry in general medicine have these origins. When it comes to the practical problem of seeing patients, my thought is that if we consider first the patient who has the illness, then carry out the accepted principles of history and examination, we will be helped in the diagnosis and we will be enabled to do a lot for our patients that otherwise we would miss.

Norbury Sanitarium.

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Cerebral Hemorrhage*

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Dr. Doyle, neurologist and psychiatrist, graduated from Rush Medical College in 1917 and received the degree of M.S. in Neurology from the University of Minnesota in 1923. In December, 1935, he became a Licentiate of the American Board of Psychiatry and Neurology. For 12 years he was associated with the Mayo Clinic. During the past 9 years he has been in private practice in Los Angeles. He is a member of the American Neurological Association, the American Psychiatric Association, Alpha Omega Alpha and the Society of the Sigma Xi. He is the author of numerous articles on neurologic topics.

Cerebral hemorrhage connotes, as a rule, an extravasation of blood involving the internal capsule and resulting in the development of contralateral hemiplegia. It actually denotes the escape of blood from any or all vessels of the brain. Embryologic defects, obstruction of the venous sinuses, certain systemic infections and dyscrasias of the blood as well as arteriosclerosis and hypertension accordingly deserve appropriate consideration.

Illustrative Cases

Case 1—General and cerebral arteriosclerosis, intracranial hemorrhage, obesity, death and necropsy.

History—A woman, aged 60, was seen at 9 p. m. March 31, 1940. Following a convulsive seizure three days previously, consciousness was not recovered and movements of the limbs were not observed. For many years she had been very obese. Marked enlargement of the abdomen, however, had been attributed to a tumor. No record of her blood pressure was available. She had been devoted to Christian Science.

Examination—The patient, who was about 62 inches tall (155 cm.), and weighed about 250 pounds (113 Kg.), was moribund. Her muscles were flaccid, her respiratory efforts shallow and irregular. The blood pressure could not be determined. She died four hours later.

Necropsy—Hemorrhage into the left cerebral hemisphere over an area about 4x5x3 cm. was found. It involved the pulvinar, approached within 3 mm. of the sylvian fissure and excavated the white matter of the temporal lobe and to some degree the adjacent part of the centrum semiovale. Diffuse atheromatous changes were noted in the vessels comprising the circle of Willis. There was moderate hypertrophy of the heart which contained large deposits of fat. Microscopically, evidence of advanced arteriosclerosis was seen in the kidneys, adrenals and pancreas.

Comment—So severe was the ictus in this case that the patient never reacted sufficiently to develop a classical picture of hemiplegia. The presence of arteriosclerosis of the cerebral vessels was readily demonstrated. The hypertrophy of the heart and the hyaline degeneration of the intima and media in a large number of small vessels in the kidneys, adrenals and pancreas were strongly suggestive of antecedent hypertension of rather long standing.

The problem of differential diagnosis between cerebral hemorrhage and uremia may be of moment in cases of this sort. With cerebral hemorrhage blood or xanthochromic coloration may be encountered in the cerebrospinal fluid. The diagnosis of uremia, however, depends upon the presence of nonprotein nitrogen retention in the blood above 120 mg. per cent, or in the cerebrospinal fluid over 0.2 per cent. To distinguish between cerebral hemorrhage and thrombosis is frequently difficult. The ratio of frequency is as one is to five. Hemorrhage has a more acute and violent onset. Early in the course of the disease there is often a fall in body temperature and conjugate deviation of the eyes, associated with flaccid extremities. If the pressure of the cerebrospinal fluid exceeds 300 mm. of water, or if the fluid shows a definite increase in the content of total protein, the diagnosis of hemorrhage is almost certain.

Sudden death following cerebral hemorrhage is the exception rather than the rule. If death occurs within 24 hours after the beginning of symptoms, hemorrhage is the more likely mechanism while thrombosis is much more common in patients surviving more than one month. The location of the lesion is an important factor in arriving at a sound prognosis. If the process involves the brain stem, the survival period is short-

* Read at the Sixty-Ninth Annual Meeting of the California Medical Association, Coronado, California, May 8, 1940.

est, averaging three days. In the region of the basal ganglia the probable duration of life is longer. If, however, the hemorrhage ruptures into a ventricle, death generally ensues rather promptly.

The more important factors in the production of hemorrhage into the brain are hypertension and arteriosclerosis. The literature is replete with references to miliary aneurysmal dilatations of the cerebral arteries, saccular enlargements, 1 mm. or less in diameter, which may develop in large numbers in the walls of the cerebral vessels of small and medium size, especially the lenticulo-striate. As a cause of cerebral hemorrhage, however, their importance has been exaggerated since they are the result of minute adventitial hemorrhages.

It was formerly assumed that cerebral hemorrhage was always due to rupture of a cerebral artery. At present, there are a number of conflicting hypotheses. It is commonly agreed that the old doctrine of rupture must in many instances be rejected. I have seen hemorrhage occur in the course of rapidly developing hypertension in the absence of demonstrable vascular lesions. It has been observed distal to embolic lesions. In general, it may safely be said that if a patient suffering from hypertension develops an appreciable rise in blood pressure, hemorrhage may ensue. Hemorrhage may also occur with acceleration of the arterial blood flow.

Massive cerebral hemorrhage may be the terminal phase in a sequence of events which has its beginning in generalized or somewhat localized disease of the cerebral arterial system resulting in the closure of one or more vessels in a circumscribed area. This leads to the creation of an ischemic zone with focal encephalomalacia. Reduction in the consistency of the tissue surrounding a diseased blood vessel may, in the presence of hypertension, be the determining factor of rupture and may permit the unhindered escape of blood. A case was seen recently in which thrombosis of the left middle cerebral and posterior cerebral arteries was demonstrated at necropsy. In the huge area of softening there was a massive hemorrhage with extension into the left lateral ventricle.

Occasionally in the development of the characteristic picture of syphilitic obliterating endarteritis, the affected artery ruptures before thrombosis has occurred. In general, however, syphilis is not a prominent factor in the causation of cerebral hemorrhage.

Case 2—Hypertension with rupture of an aneurysm of the anterior communicating artery, death and necropsy.

History—A man, aged 34, who had had hypertension for several years, was examined July 30, 1939. Early that morning on returning home from "a party" he had developed severe, surging, occipitonuchal headache associated with nausea, vomiting and stiffness of the neck.

Condition and Course—The patient was a large, somewhat obese man of plethoric appearance, whose blood pressure ranged between 220/110 and 226/120. The temperature was 97.8° F. and pulse rate 46. There was a marked degree of cervical rigidity. Kernig's sign was strongly positive bilaterally. The leucocytes numbered 18,640. The significant findings in the urine were albumen ++++, three erythrocytes per h. p. f. and a moderate number of hyaline and granular casts. Lumbar puncture revealed bloody cerebrospinal fluid under increased pressure containing 108,000 erythrocytes and 150 leucocytes per cubic millimeter. Subsequently, the pulse rate rose to 64 and the headache was relieved. The following day the patient was restless and vomited. The headache returned and he became unable to move the lower limbs. On August 4th, 25 c.c. of bloody cerebrospinal fluid under 340 mm. pressure was withdrawn. Shortly afterward Cheyne-Stokes respiration set in. The eyes deviated sharply to the left for two minutes. At the end of 20 minutes consciousness returned. The left upper limb could scarcely be moved. The patient lapsed into coma. On August 10th the systolic blood pressure was 96 and the diastolic 70. He died that evening with a temperature of 107.2° F.

Necropsy—A ruptured aneurysm of the anterior communicating branch of the circle of Willis, associated with extensive leptomeningeal hemorrhage was demonstrated. The meningeal hemorrhage was most abundant below the frontal lobes and in the anterior portions of the sylvian fissures. Fairly marked hypertrophy of the left half of the heart, and generalized arteriosclerosis were also noted.

Comment—It has been shown that embryologically the anlagen of a given artery and

its branches are laid down separately. In some instances fusion is incomplete, leaving areas of weakness at points of bifurcation. In the course of time an aneurysm of a cerebral artery ("berry aneurysm") may develop. Hypertension and anomalies of the general circulation such as coarctation of the aorta, may hasten rupture.

The complicated structure of the circle of Willis, with its sharp angles and changes in current, favors the development of aneurysms, the preponderance of which involve the anterior communicating artery. The exact diagnosis and localization of the aneurysms is possible, however, only in cases with intermittent bleeding and focal compression.

Case 3—Thrombosis of the superior sagittal sinus with cerebral hemorrhage, death and necropsy.

History—A man, aged 28, examined April 5, 1926, complained of convulsions. Ten months previously he had suffered from severe headache for seven days. On the third day he became delirious, vomited several times, and had three convulsions of tonic nature. For the two following months he was weak and unable to read fine print, although his vision for distance was normal. Two months and again one week before examination he had general convulsions.

Condition and Course—The patient was large and red-faced, had an adenoma of the thyroid gland. The pulse rate was 108. All pulses, including the abdominal aortic, were small. The systolic blood pressure was 140 and the diastolic 90; the basal metabolic rate was +27. Neurologic and ophthalmoscopic examinations were objectively negative. Examination of the cerebrospinal fluid gave negative results; the pressure was 120 mm. Twenty-four hours later the patient complained of severe headache. On the third day, a convulsion involved the left foot, leg and thigh, in that order. The attacks continued to recur and finally involved the left upper extremity. On the fifth day, the patient's face was cyanotic and he was stupid. Hemiplegia of the left side and left homonymous hemianopia were present. Convulsive seizures were repeated at short intervals. On the seventh day the patient became comatose. He died with a temperature of 107.6° F.

Necropsy—Thrombosis of the superior sagittal sinus from the superior frontal gyrus to the confluens sinuum was found. There was hemorrhagic softening of the right side of the brain from the superior frontal gyrus to the calcarine fissure, and of the left side of the brain chiefly in the region of the precentral and postcentral gyri.

Comment—The hemorrhages in this case resulted from mechanical obstruction to the venous circulation with increased venous pressure and anoxemia. The unit lesion is a petechial extravasation. As coalescence of these hemorrhagic foci occurs, larger lesions are formed leading to a pathologic picture sometimes called hemorrhage encephalitis. Cerebral thrombophlebitis, caused as a rule by extension of infection from the middle ear, may lead to a similar pathologic picture. Lesions of the same sort may follow asphyxia due to inhalation of illuminating gas. They may occur in the new-born because of respiratory failure of the monther.

Case 4—Subacute bacterial endocarditis with cerebral hemorrhage due to rupture of a mycotic aneurysm of the middle cerebral artery, death and necropsy.

History—A man, aged 24, who was examined on July 10, 1934, complained of weakness, shortness of breath and fever which had begun four months previously. Subsequently, he had suffered for one week on several occasions from pain, first in the left and later in the right knee. He had "always been somewhat ill" after he developed rheumatic fever in childhood.

Condition and Course—The skin was sallow. Petechiae were present in the buccal mucous membrane and the skin of the palms and soles. The heart was markedly enlarged. Systolic and diastolic murmurs were heard over the entire precordium. The temperature was normal while the pulse rate was 140. There was a moderately marked degree of secondary anemia. The condition of the patient gradually grew worse.

On August 25th the right hemiplegia with marked aphasia and hyperpyrexia appeared abruptly, only to disappear almost completely in three days. Left hemiplegia with loss of consciousness set in suddenly about 6 o'clock on the morning of September 4th. The patient died at 12:30 p. m. on that date.

Necropsy—Subacute bacterial endocarditis

involving the mitral valve, old endocarditis involving the aortic valve and producing stenosis and insufficiency, and extensive cerebral hemorrhage due to rupture of a mycotic aneurysm of the right middle cerebral artery were found. The hemorrhage excavated the superior part of the right temporal lobe, the cortex of the island of Reil and the lateral part of the corpus striatum. It extended anteriorly to the beginning of the sylvian fissure and posteriorly in the white matter of the parietal lobe as far as the genu of the lateral ventricle. An older hemorrhage measuring 2x2.5 cm. was discovered in the left island of Reil.

Comment — Neurologic and psychiatric symptoms are frequently encountered with subacute bacterial endocarditis. In the earlier weeks they may dominate the clinical picture. Widespread reactions in the brain based on occluded arterioles or capillaries are almost invariably observed at necropsy. Occasionally, the walls of larger vessels are damaged by emboli to such a degree that mycotic aneurysms develop. As in this case, rupture of an aneurysm may be the terminal event.

Case 5 — Thrombocytopenic purpura with cerebral and subarachnoid hemorrhage and death.

History—A woman, aged 21, examined July 20, 1939, complained of "terribly severe, bursting headache," "vomiting everything" and a feeling she "could sleep forever" which had begun eight days before. Since June 10th the patient had noted small areas of ecchymotic discoloration of the skin. Following the sudden development of headache over the right eye on July 4th, she was aware of numbness of the left half of her person for thirty minutes. On July 10th she suddenly developed pain over the right eye, nausea and somnolence. For 10 or 15 minutes there was weakness of the left half of the body. Every 2 or 3 days thereafter she suffered from momentary spells of "passing out." Lumbar puncture was made on July 15th. When the patient began to talk while the needle was still in place, the fluid, which had been clear, became bloody. On July 17th there was slight cervical and lumbar rigidity. The patient was in "total blindness" on the morning of July 19th. Vision returned that afternoon following a transfusion of 650 cc. of whole blood.

Condition and Course—The patient was pale, weak, apprehensive and slightly somnolent. She showed evidence of hyperaesthesia to painful stimuli and manifested cervical rigidity and positive Kernig's signs of slight to moderate degree bilaterally. The concentration of the hemoglobin of the blood was 44 per cent. The erythrocytes numbered 4,190,000, the leucocytes 6,300 and the platelets 40,000. The clotting time was normal. The bleeding time was prolonged. There was no tendency for the clot to retract at the end of 24 hours. During the ensuing 48 hours the patient became "more and more groggy." About 4 p. m., July 21st, the function of the left upper limb was lost. Later she had episodes of speechlessness of momentary duration. On July 22nd the patient was almost comatose. There was left hemiparesis. Ophthalmoscopic examination revealed edema of the optic discs with large peripapillary hemorrhages. The cerebrospinal fluid continued to be bloody. A hematoma formed at the site of puncture. The stools became tar-like. Bleeding occurred from the vagina. Suction induced profuse petechial reactions. The capillary resistance test was positive. On July 26th the erythrocytes were reduced to 2,310,000 to the cubic millimeter. Despite transfusions of whole blood, the intramuscular injection of blood, cevitamic acid and mocassin venom and repeated lumbar punctures, the patient died at 7:20 a. m. July 27th. Necropsy was refused.

Comment — Thrombocytopenic purpura is characterized by alterations in the capillaries which render them more permeable than normal. It is characteristic for hemorrhages to occur into the skin and from the nose, mouth, lungs, digestive tract, urinary tract, and uterus. From time to time hemorrhages occur in the brain. It is clear that in this case hemorrhages, probably of petechial nature, appeared early. With the march of clinical events, definite focal involvement of the brain by hemorrhage as well as meningeal irritation, due to blood in the subarachnoid space, became apparent and ultimately led to the patient's death.

It is obvious that as one of the causes of disability and of death, cerebral hemorrhage holds a place of no mean importance. The diminishing incidence of certain infectious

diseases and the increasing efficacy of treatment of infectious and constitutional disorders may be expected to increase the span of life and to augment the number of its potential victims.

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Hypnosis: A General Review

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Dr. Erickson graduated in 1928 from the University of Wisconsin Medical School, and interned at the Colorado General Hospital and at the Colorado Psychopathic Hospital. Following this, he became Assistant Physician at the Rhode Island State Hospital for Mental Diseases, and then joined the Research Service of Worcester State Hospital. Since 1934 Dr. Erickson has been on the staff of Eloise Hospital, where he is the Director of Psychiatric Research and Training; he is also Assistant Professor of Psychiatry, Wayne University College of Medicine. He is a diplomate of the American Board of Psychiatry, a fellow of the American Psychiatric Association, and a member of the American Psychological Association and of the American Psychopathological Association. He has published thirty-five papers on various psychiatric problems, particularly in the field of hypnosis.

The history of hypnosis is as old as that of the human race. The most primitive of savages, both ancient and modern, were aware of this striking psychological manifestation and it was utilized in the mystic rites of their medicine men to produce fear and to intensify belief in the supernatural and the occult. With this long historical past of supernaturalism and mysticism, coupled with its own startling, inexplicable, and bewildering phenomenology, it is not astonishing that the general public's attitude toward hypnosis has been and still is one of misunderstanding, antagonism and actual fear, and that the first development of any scientific interest did not occur until the last half of the 18th century.

These first scientific beginnings in the study of hypnosis began with Anton Mesmer about 1775, from whose name has derived the term "mesmerism," still in current usage. Mesmer's use of hypnosis began with his discovery that selected types of medical patients responded satisfactorily to a stroking of their arms and ailing parts and suggestions of sleep. Mesmer attributed these therapeutic results to the transferring to the patients of a "quality" of "animal magnetism" and he developed the theory that animal magnetism was some peculiar cosmic fluid with healing properties. Despite Mesmer's excellent intuitive knowledge of clinical psychology, as evidenced by his elaborate clinic in which he employed colored lights, incense, music and rich draperies to impress his patients and establish in them a receptive state of mind, he had no realization of the psychological nature of his therapy. Nevertheless, he treated successfully large numbers of patients on whom orthodox medical procedures had failed, but unfortunately his personality and the mystical character of his therapy served finally to bring him unjustly into disrepute. However, many physicians had visited his clinic during the height of its success and had learned unwittingly one of the first lessons in the then unknown art of psychotherapy, specifically, the importance of clinical psychology.

Since Mesmer there has been a succession of outstanding men who became interested in hypnosis and utilized it successfully in medical practice, giving it an increasingly more scientific foundation and validity. Elliotson, the first man in England to use the stethescope, became interested in hypnosis about 1817, employed it extensively and left excellent records of its therapeutic efficacy in selected cases. Esdaile, stimulated by Elliotson's case reports, became an ardent advocate of mesmerism, as it was then called, and actually succeeded in interesting the British government in building a hospital in India where he used it extensively on all types of medical patients, leaving many excellent records of major and minor surgery performed under hypnotic anaesthesia.

The initiation of a psychological understanding of the phenomenon began in 1841 with James Braid, at first an opponent and then later a most ardent investigator and supporter. It was he who invented the term hypnosis, recognized the psychological nature of hypnotic sleep, and described many of its manifestations, devising methods whereby to

test their validity.

Since Braid, there has been a constantly increasing number of clinicians first and psychologists later, among them many outstanding scientists, who have contributed greatly to an establishment of its scientific validity and opened it as a field of scientific investigation and therapeutic endeavor. The result now is that during the past 20 years there has been a progressively rapid increase in the amount of attention given to hypnosis as a problem of significant scientific interest by the medical profession, particularly psychiatrists, and by psychologists in university laboratories.

Unfortunately, particularly among the psychologists, there is still a tendency to develop research along the outmoded concepts and techniques of the 19th century. Thus, in a recent paper by a psychologist, the statement was made that the experimental technique was based entirely on Braid's original methods and in another paper the declaration was that Forel's technique and criteria of fifty years ago had been used implicitly. Thus, while interest in hypnosis as a scientific problem has advanced, it is still in its infancy and needs development in terms of present-day understandings and concepts of personality and interpersonal relationships.

General questions always arising when hypnosis is mentioned concern its possible detrimental effects upon the hypnotic subject, the possible anti-social use of hypnosis, the character of the relationship between the hypnotist and the subject, the controllability of the hypnotic state, and the relationship of hypnotic sleep to physiological sleep.

To all of these questions one may make a comprehensive reply by stating simply that the hypnotic state is essentially a psychological phenomenon, unrelated to physiological sleep, and dependent entirely upon full cooperation between hypnotist and subject; neither is it injurious or detrimental to the subject in any way, nor can it be used for anti-social or criminal purposes. Each of these statements is based upon extensive, carefully controlled experimental investigations too numerous to cite, and conducted by many investigators. References, however, will be listed at the conclusion of this paper.

The general mistaken belief is that the hypnotist exercises some remarkable power over his subject, that hypnosis is a matter of dominance and subservience, of strong mind over weak will, and that hence all manner of undesirable results may obtain. Actually, of course, hypnosis depends upon full cooperation between hypnotist and subject, and without willing cooperation there can be no hypnosis. Furthermore, the hypnotic subject can be both hypnotist and subject, and more than one hypnotist has been hypnotized in turn by his own subjects to further the development of experimental work. Because of the absolute need for cooperation, a subject cannot be hypnotized against his will nor without his knowledge, nor can a subject be kept in a trance without his cooperation. Nor can a cooperative subject be left in a trance an unreasonable length of time without his full understanding and cooperation. In brief, hypnosis and every use made of the trance state necessarily depends upon full and ready cooperation with adequate and direct understanding on the part of the subject of what is desired.

Another fact of importance is that there can occur no detrimental effects from repeated trances, even over a period of years. This fact has been confirmed by the experience of hypnotists who have been interested in this possibility and by the experience of subjects who have been hypnotized hundreds and even thousands of times. In addition, when one considers the difficulty in producing wanted therapeutic changes in the personality by hypnosis, the possibility of effecting unwanted changes becomes remote and most unlikely.

The best hypnotic subjects are normal people of superior intelligence and any really cooperative person can be hypnotized. Maladjusted, hysterical, feebleminded, or psychotic persons are usually difficult to hypnotize, although there are many exceptions. For this reason, hypnosis as a therapeutic measure is often difficult to apply despite full cooperation.

Concerning the technique of the induction of hypnotic trances, this is a relatively simple matter requiring primarily time, patience, and careful attention to and consideration for the subject, his personality, and his emotional attitudes and reactions. Properly, there

is no set form or pattern to follow, just as there is no set form for a good bedside manner. One needs the respect, confidence, and trust of a subject, and then one suggests fatigue, a desire for sleep and rest, an increasing feeling of sleep, and finally a deep sound restful sleep. These suggestions are given repetitiously, with gradual progression from one to the next, always with careful reassurance of the subject as he makes response to them. The making of passes, the use of crystal balls, the staring into the subject's eyes, and various other mystical procedures belong to vaudeville or ancient history. One simply, persuasively and patiently suggests sleep of a restful character until the subject does sleep, and then the subject is instructed to remain asleep until all reasonable purposes are accomplished. There should be no forcing or rushing of the subject and every effort should be made to enable the subject to appreciate any physical feeling he has suggestive of sleep. This simple technique can be learned by anyone, and anybody who has been hypnotized can employ it to hypnotize others, given cooperation and the patience to make use of it. As for awakening the subject, one can suggest an arousal directly, or give the subject suggestions to the effect that he is slowly and progressively awakening, repeating these suggestions until the subject is fully awake.

Once the trance state has been induced, there will become manifest various general phenomena characteristic of hypnosis, though not all are necessarily manifested by each individual subject. Foremost is the condition termed *rapport,* in which the hypnotic subject responds only to the hypnotist. In the deep trance he is seemingly incapable of hearing or seeing anything unless so instructed by the hypnotist. However, this rapport may be transferred to others by appropriate suggestions by the hypnotist.

A second phenomenon is *catalepsy.* As a result of the hypnosis, there develops in the subject an increase in muscular tonus so that there seems to be the same condition as exists in the stuporous catatonic patient manifesting flexibilitas cerea. Thus, the subject's hand, raised up in the air by the hypnotist, is held in that position apparently without fatigue until the hypnotist either puts it down, or instructs the subject to lower it.

Amnesia constitutes another phenomenon of interest. Particularly after a deep trance the subject tends to have a profound amnesia for everything that occurred in the trance situation. This amnesia is subject to control since the hypnotist can suggest the recovery of the memory of some or all items of the trance experience, or the subject may deliberately set himself the task of remembering everything. This phenomenon is most inconstant and uncertain, depends upon many individualistic and situational factors. In an experimental procedure, the amnesia can be demonstrated to be as resistant to all nonhypnotic forces and as profound as amnesias developing pathologically.

Suggestibility is, of course, a primary feature of hypnosis, and is necessarily present. However, there is always a need, if serious and satisfactory purposes are to be achieved, to give suggestions in accord with the subject's understandings and desires, although in the type of hypnosis practiced on the vaudeville stage, ridiculous and undignified suggestions can be given. In the experimental psychological laboratory any number of behavioral responses can be suggested and subjected to study, such as suggestions of amnesia, recovery of memories, hallucinations, delusions, anaesthesias, deafness, blindness, identifications, disorientation, etc. In the medical situation, suggestions relating to the problem in hand can be given, such as the suggestion to recall a forgotten troublesome traumatic life experience, or the suggestion to avoid or to meet adequately some difficult problem.

However, regardless of the suggestibility of the subject, there is frequently a primary need to give suggestions indirectly rather than directly and dogmatically as if hypnotic suggestions were miraculous in effect.

Another common phenomenon is the capacity for visual hallucinations often described as "crystal gazing." Essentially, this is the result of suggestion to the effect that the subject visualize various scenes and memories. This phenomenon is of great significance in investigative and experimental work upon legitimate psychological and medical problems. The ability, called forth by hypnotic suggestion, to reconstruct a visual image of

a past and even forgotten experience is often of great service in psychological research and in psychotherapeutic procedures.

Automatic writing, long known but mystically regarded, is often easily elicited in the hypnotic state. It is essentially the act of writing without any awareness of the fact. Such writing is comparable in its processes to the unwitting mouthing and chewing the absorbed mother does when she spoon-feeds her baby. This automatic writing can be elicited without hypnosis, during hypnosis and after hypnosis, and the context of the writing represents usually material of which the person is not consciously aware and which he often rejects as not his, or as meaningless to him. In the psychological laboratory or in the psychotherapeutic situation such automatic writing is of great value in the study or analysis of behavior and in the eliciting of important but otherwise unavailable information.

Post-hypnotic suggestion, or the giving of suggestions to the hypnotized subject to be acted upon at some later time when he is awake, constitutes another most interesting phenomenon. By this measure the hypnotic subject's behavior can be directed and controlled subsequent to the trance state, but only to a reasonable and acceptable degree. Thus the subject may be told to perform a certain act at a given time in the future, and at that time he does as instructed, usually without awareness that he is doing so, or, if he is aware of his conduct, without any understanding of why he is so doing. Rather he thinks he is acting spontaneously since there is an amnesia for the post-hypnotic instructions. In this way, effective therapeutic suggestions can often be given.

The scientific applications of hypnosis are as yet only in the developmental stage. The persistence of unsound mystical beliefs and mistaken fears about hypnosis, now fortunately being discarded rapidly, have hampered and delayed its scientific growth. Also, much of the serious study made of hypnotic phenomena has been based upon concepts of hypnosis developed long before present-day understandings of dynamic psychology and psychiatry. Furthermore, many of the efforts made to study hypnosis scientifically in psychological laboratories have omitted all clinical personality considerations relating to the hypnotic subject as a person and have attempted unfortunately to deal with hypnotic manifestations as didactic academic items unconnected with a human personality. With the present rapid increase of recognition by psychologists of dynamic and personality factors and forces, there is developing a new and more fruitful trend in the study of hypnotic behavior, and the psychologists are now beginning to discard the old belief that hypnosis transforms a person into some strange passive dominated new creature. Instead they are beginning to realize that hypnosis can be used and should be used to elicit the natural and innate behavior and reactions of the subject and that through such a measure human behavior can be studied in a controlled scientific manner.

Primarily, the greatest field of application for hypnosis is in the study and analysis of human behavior and disturbances in behavior. By means of the hypnotic trance it becomes possible to suggest to the subject any chosen form of behavior and response and thereby have literally a laboratory in which to synthesize and analyze any desired pattern of behavior. For example, the problem of amnesia can be treated as a laboratory investigation by creating, removing and re-establishing an amnesia and slowly and systematically studying the psychological processes and mechanisms involved in such mental processes. Similarly, one can through hypnosis duplicate in his subject the symptomatic manifestations of personality disturbances and emotional stresses and have an opportunity to study such problems in laboratory form in a manner similar to the laboratory study of medical problems and procedures before application is made to an actual patient. Instead of speculating vaguely and attempting to deduce uncertainly the consequences of a patient's complexes and conflicts, necessarily of unknown character, one can build up in a hypnotic subject a complex or conflict of known character and then have the direct opportunity of studying its results and consequences upon the subject with a view to determining the psychological sequences and inter-relationships of the various manifestations and their significances to the personality.

The usefulness of hypnosis to medicine lies in two fields of application, that of research and that of psychotherapy. In relation to both fields its usefulness relates primarily to behavior problems, emotional disturbances, minor forms of psychopathology and the neurotic or psychoneurotic illnesses which confront the general practitioner on every hand. However, its applications are greatly restricted, aside from the need for special laboratory situations for research and selected types of patients for psychotherapy, by the general public misapprehensions concerning hypnosis, the irrational fears entertained about it, and the primary need for unlimited time and effort if effective results are to be obtained. Too often, in both fields of application, unsatisfactory results are obtained because of the tendency to regard hypnosis as a miracle producer and to substitute dogmatic emphatic hypnotic suggestion for a laborious time taking systematic procedure of experimental investigation or of psychotherapeutic re-eduation. It is not a miracle worker, even though its results sometimes seem to be miraculous. Rather it is an effective measure by which one can slowly, carefully, and thoroughly elicit, as a result of careful suggestions, forms of behavior, emotional reactions, insights and understandings which would be impossible or nearly so in the ordinary waking state in which the subject's attention to a chosen field cannot be so completely secured and rigidly fixed as it can be in hypnosis.

Unfortunately for the development of adequate research in medical applications of hypnosis, most of such investigators are psychologists untrained in clinical medical and psychiatric aspects of personality disorders. However, as psychologists become increasingly aware of the personality implications of hypnotic research, such problems as amnesia will cease to be studied entirely in terms of statistical evaluations of nonsense syllables learned and forgotten and approached more frequently in terms of dynamic behavior reactions peculiar to the personality of the hypnotic subject, who, in turn, will be recognized as a human being and not treated, as is the tendency of psychologists today, as a passively responsive laboratory instrument.

As for direct psychotherapeutic use of hypnosis, aside from the problems imposed by public mistrust and the need to select suitable patients, there is also the problem of avoiding the too common errors in psychotherapy of forcing the suggestions upon the subject. Rather than hypnotically treating a patient suffering from a phobia for doorknobs by telling him in the trance to forget his phobia, to overcome it, to realize its foolishness, one tries instead by hypnosis to elicit indirectly and adequately the story of the genesis of that phobia and to build up in him anew his own forgotten and repressed pattern of normal behavior toward doorknobs. One does not try to force upon his patient a new pattern of normal doorknob behavior, but rather to reestablish the old unused and forgotten pattern of behavior the patient had previous to the development of his phobia. One may temporarily relieve symptoms, but medicine is interested in a cure by complete removal and not in symptomatic relief. But such methods are slow and laborious and hence, only those wishing to spend adequate time and effort should try them.

Recent clinical work, some of which will be listed below, has shown the possibilities and fruitfulness of hypnosis in approaching the problems of personality disturbances and psychoneurotic illnesses, and it is this field of medicine in which hypnosis can contribute greatly and unquestionably will as increasingly adequate recognition is given to the value of hypnosis.

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Electrical Aspects of the Epilepsies*

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While records of electrical activity in the brain were made as early as 1875, no general interest in the subject was evinced until about 1930, when the alpha wave was demonstrated in man. Since that time, the electrical activity of the brain has been studied extensively in many clinical conditions, by taking leads from the unopened skull and, to a much less extent, by leading directly from the brain or meninges. Many findings in different conditions have been reported, but those that have been repeatedly confirmed and are of practical importance to the clinician are two: the findings in the epilepsies, and the findings in discrete organic lesions of the brain, such as tumors, abscesses, hemorrhage, and scars.

The electrical phenomena which arise from the brain in both normal and pathological conditions, and are detectable at the scalp may be divided into two classes, periodic or rhythmic waves and aperiodic, or irregular phenomena. While it is possible that the brain might under some circumstances give off waves of almost any frequency between one cycle in 5 or more seconds and 35 cycles or more per second, there seem to be certain frequency bands into which most of these waves fall, and certain frequencies which are not often seen.

Fig. 1 shows a rough average of the brain wave spectra from the electroencephalograms of a considerable number of our patients.

Roughly speaking, those frequencies which lie between 7.5 and 40 per sec. seem to occur in the normal and healthy, although their absence or their relative amounts when present may be of considerable pathological significance. Those frequencies which lie below 7 per sec. appear to be pathological, and to accompany pathological conditions, with the possible exception of sleep in which slow waves are seen, but in which their frequency, except in deep sleep, is seldom maintained long enough to count at any definite figure.

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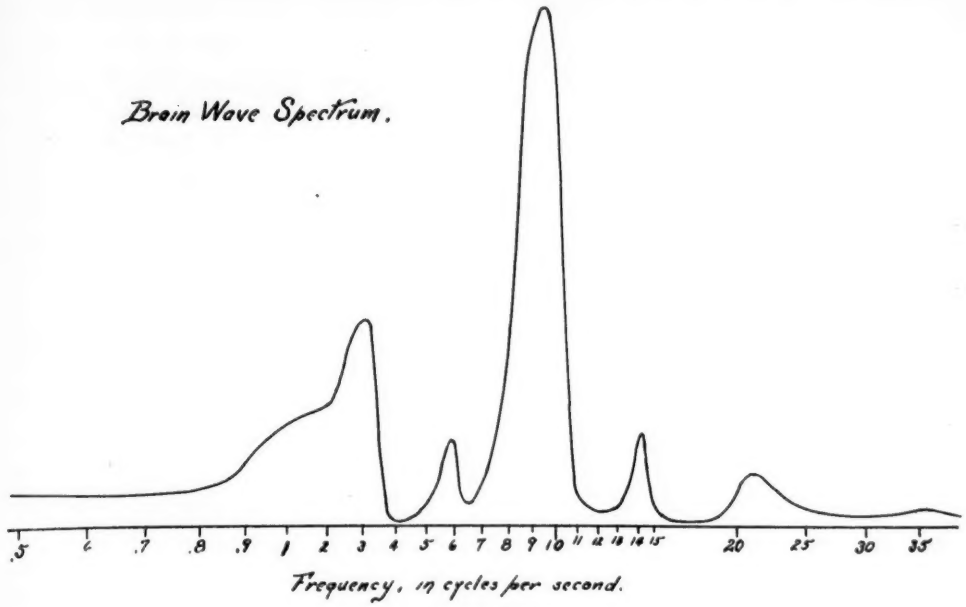

FIGURE I

The regular or rhythmic phenomena which are normal and which lie on the right side of Fig. 1, that is above 7 cycles per second, appear in four bands. The most prominent of these occupies the range from 7.5 - 11 cycles per second, and waves in this range are called alpha waves. These are normally obtained in almost all people although their size and shape vary from person to person. The ease with which they appear is also a personal peculiarity, varying with the degree of relaxation and other factors. Alpha waves have the peculiarity of appearing when the eyes are closed and disappearing when they are opened and are the most prominent and constant feature of the average electroencephalogram.

The regular waves which appear on the left of Fig. 1 and have a frequency of less than 7 per sec. are pathological and have been contributed by patients with epilepsy, and by patients with tumors and other intracranial conditions. The two bands composed of frequencies around 3 per sec. and around 6 per sec. have been contributed largely by patients having minor epilepsy. The region from one-half of one cycle per sec. to 3 cycles per sec. has arisen largely from patients with intracranial tumors. It is in these two latter fields that electroencephalography has so far proved of greatest practical usefulness to the clinician.

General Findings in the Epilepsies

Perhaps the greatest aid that electroencephalography can offer the clinician in epilepsy is in the recognition of doubtful cases. We need no electrical aid to recognize a major seizure; but there are large numbers of doubtful minor epileptics and pyknoleptics in whom the clinical diagnosis is by no means easy. Many of the problem children, if examined electrically, are found to show abnormal electrical waves, although without clinical evidence of seizure.

The classification of the epilepsies from a clinical standpoint has been very jumbled and irrational. And while electrical investigation has revealed a great deal about what happens in various epileptic conditions, a classification based on electrical manifestations is, in the present state of our knowledge, not very much more helpful. The one thing that seems to be common to all the epileptic conditions is increased electrical activity. This increased activity is manifested in several ways: (1) by an increased amplitude of normal waves, (2) by the presence of waves of abnormal frequencies, (3) by the presence of peculiar patterns, (4) by transients and abortive modifications of the three preceding.

One of the chief things apparent from electrical studies of the epilepsies is that no hard and fast lines can be drawn between them. Some of the clinical epileptic conditions seem

to have electrical pictures more or less peculiar to them, but a high percentage of such patients show a mixture of these electrical patterns.

Pyknolepsy

Perhaps the purest and most typical of the electrical changes seen in the epilepsies is that which occurs in pyknolepsy. Pyknoleptic seizures occur most typically in children from 8 to 11 years of age. Such a child will bat his eyes, stop talking, possibly drop what he is carrying. He does not fall. He may or may not resume the conversation where he left off. He may or may not realize that he has had an attack. Figure 2 shows the electrical picture which accompanies such an attack. It is made up of a series of rounded waves between which, or in some part of each of which, a sharp spike is typically found. This has come to be called the "Hump and Spike Formation." Such an attack is apt to occur in a given person with great regularity, e.g. once every five to fifteen minutes, but is often by no means so regular. Each attack usually lasts from five to fifteen seconds. This picture is surprisingly constant from person to person. The frequency of these waves has been, in my experience, invariably 3 per second at the start of the seizure, usually slowing down to about 2.2 per second as the attack progresses. The position of the spike with respect to the hump varies with the location of the recording electrodes. It also changes as the attack progresses.

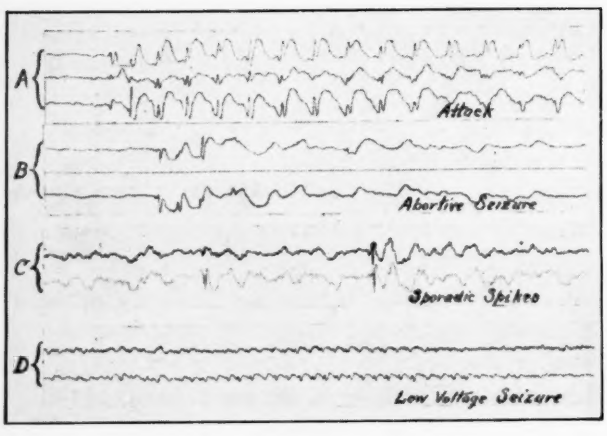

FIGURE II

The interval between attacks in the pyknoleptics may be relatively free from increased electrical activity, or it may contain a considerable amount of irregular and more or less disorganized activity. This activity may appear as an occasional hump and spike, in a background of irregular activity, may start out like an attack but peter out in a second or so, or may show a hump and spike formation for several seconds at a voltage level much less than that of the usual seizure. Such abortive or poorly developed electrical phenomena are without clinical manifestations.

One of the most striking peculiarities of these pyknoleptic children, as well as of many children with minor epilepsy, is a tendency to develop 3 per second waves, most prominent in the occipital regions, when the eyes are closed. These disappear when the eyes are opened. The normal alpha wave is usually absent, both when the eyes are open and closed. This 3 per second wave which appears when the eyes are closed, is without spikes, is not associated with any clinical manifestation of a seizure, and must be contrasted with the normal 10 per second alpha wave which develops in the occipital region of most normal persons when the eyes are closed. In Figure 3 such 3 per second waves have been lined up with an attack experienced by the same patient a few minutes later, to show that the frequencies are identical.

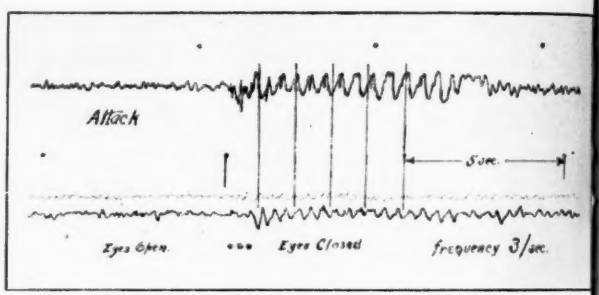

FIGURE III

Five pyknoleptic children, aged eight to ten, seen about three years ago with such seizures, and with such 3 per second occipital waves when the eyes were closed, are now free from attacks and considered well. Such a picture in children between the ages of eight and eleven presents a highly favorable prognosis.

Minor Epilepsy

Although most common in children and young adults, minor epileptic seizures may occur in people of any age. Electrically, the

attack is similar to the pyknoleptic picture described above. Perhaps the chief difference lies in the electrical activity in the intervals between attacks. In the minor epileptics, the regions between attacks are apt to show increased electrical activity, often irregular and with abortive seizures. They are, however, even more likely to show very regular waves. One of the most striking and consistent findings in minor epileptics is the presence of 6 per second waves. Such waves are usually seen as much in the frontal and parietal as in the occipital regions. They are not affected by opening and closing the eyes. Bursts of 6 per second waves sometimes alternate with the normal alpha waves. Occasionally, 3 per second and 1.5 per second waves are seen in minor epileptics.

In Figure 4 the first tracing shows a minor epileptic seizure having the usual frequency of 3 per second. The next two tracings show waves at 6 per second and at 1.5 per second. These were all cut from the same record and appeared within a short time of each other. They have been lined up with the attack to show that they bear the relation of even whole numbers to the attack frequency.

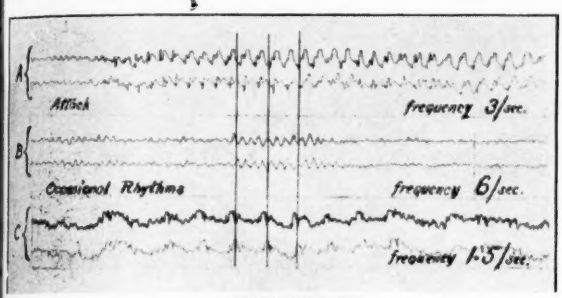

FIGURE IV

Major Epilepsy

In major epilepsy the electrical change consists mainly of a series of sharp spikes, often irregularly spaced, but sometimes occurring quite regularly at a frequency very roughly around 30 per second. These may be interrupted by occasional slower waves, and as the attack terminates the activity almost entirely disappears, becoming even less than before the seizure.

Idiopathic Epilepsy

The term "idiopathic epilepsy" is applied to those cases who have clinical seizures without demonstrable cause. From the electrical standpoint they can be divided into two groups: those who show practically no abnormal electrical activity between attacks and those who show considerable electrical activity between attacks.

In the first group, those who show little electrical activity between attacks, the seizures may be either major or minor; they are rarely psychomotor or Jacksonian in type. The second group of idiopathic epileptics, those who have considerable abnormal electrical activity between attacks, may have major seizures, minor seizures, psychomotor seizures, Jacksonian fits, or other epileptic manifestations, or they may have no seizures at all. In the recognition of this group the electroencephalogram may be of great value to the clinician.

One of the most constant and striking features of the electroencephalogram in many idiopathic epileptics is increased electrical activity. This activity may be confined largely to one frequency band or may exhibit much irregularity, the latter being more common. Figure 5 shows records from four such patients. The first has large numbers of 3 per second waves, which disappear when the eyes are opened. In the second the activity is predominantly in the 6 per second band. The last shows a large amount of irregular activity with occasional bursts of 3 per second waves. The last record was from a girl of fifteen without any history of clinical epilepsy but who was definitely a problem child. The possibility of potential epilepsy had not been very seriously entertained in this case.

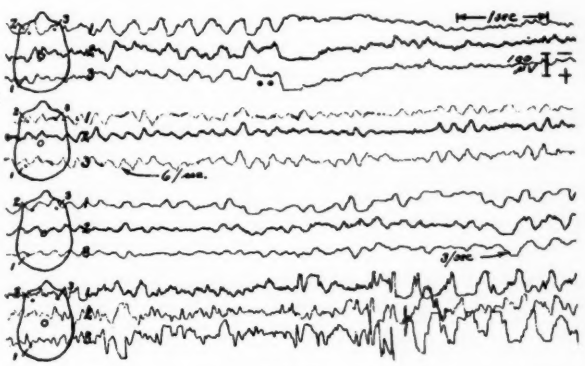

FIGURE V

Jacksonian Attacks

Of peculiar interest to the clinician and particularly to the neurosurgeon are those idiopathic epileptic children who complain

of Jacksonian seizures. Many such children show the electrical findings which are described above. The Jacksonian seizures result simply from one part of their brain having a slightly lower seizure threshold than elsewhere in a brain that has everywhere a much higher level of electrical activity than normal. I recall one such case, at the time this work was starting, who was diagnosed parasagittal meningioma, but in whom at operation the brain appeared normal. This patient is now in worse condition than before, probably due to the scars that have formed over an already very irritable region.

Probably many of the so-called psychomotor seizures result similarly from areas of lowered threshold in the frontal regions of idiopathic epileptics.

"Epilepsy" and Marriage

In the last year or so considerable interest has been aroused from the electroencephalographic examination of all available members of families in which one or more members have clinical epilepsy. It has been found in many instances that several other members of such families, who do not themselves have clinical epilepsy, show electrical changes such as are seen in idiopathic epileptics. Such changes have been noted in the parents (who do not have clinical epilepsy) of epileptic children. I have recently examined the five children of such a family, only one of whom had clinical epilepsy. Four of these children were found to have the electrical picture of idiopathic epilepsy. Only one was normal. It is likely that the three who do not now have clinical epilepsy may develop epileptic manifestations at some time in their lives, if the proper circumstances arise. The question as to whether such people should marry has been raised. In as much as these electrical changes seem to gradually lessen during the years from fifteen to twenty-five years of age, the electrical prognostication of potential epileptic seizures in adults is more difficult and less certain.

There are three principal findings in the electroencephalogram that are of great significance in idiopathic epilepsy. They are: increased electrical activity, 3 per second waves, and 6 per second waves. Together they constitute a triad which is pathognomonic of potential idiopathic epilepsy, and in the presence of which the prognosis of potential epilepsy can be made regardless of the clinical history. These features of increased electrical activity, which mark the electrically active type of idiopathics, seem to be much more commonly seen in children and to disappear gradually during adolescence. In my experience, they are seldom seen spontaneously after the age of twenty-five, but can sometimes be brought out by hyperventilation.

Summary

Epilepsy is accompanied by increased electrical activity of the brain. This activity has typical forms, but many departures from and mixtures of these forms are seen. Such increased activity is commonly present between clinical seizures and in their absence. This activity diminishes during adolescence. Electroencephalography is of signal value in the study of this increased electrical activity, and hence in the diagnosis of the "epilepsies" and the prognosis of potential epilepsy.

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On the Differential Diagnosis of Organic and Psychogenic Disturbances

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One of the ever present problems of medical practice is that of differentiating between a psychoneurotic or psychogenic syndrome, on the one hand, and on the other hand a symptom complex which is based upon a true but obscure organic disturbance. Often the general practitioner in trying to solve such a problem avails himself of the special knowledge and experience of the surgeon, the neurologist, the psychiatrist or representatives of other specialties. Indeed, the handling of such problems often makes inevitable the close cooperation of the general practitioner and the specialist. However, in the final analysis, it is upon the general practitioner that the major part of this problem devolves, since it is he who first sees these cases.

Sometimes, unfortunately, that close cooperation between the general practitioner and the psychiatrist is overcast by a cloud of mutual suspicion. The general practitioner may suspect that the psychiatrist is too ready to make a diagnosis of psychogenic disturbance, even to the extent of overlooking possible organic pathology. On the other hand, sometimes the psychiatrist may feel that his colleague has a tendency to overlook psychological and emotional pathology and thus to treat psychoneuroses as if they were organic conditions. It is likely that each is able to support his suspicion by quoting a case or two in his practice or in the literature. However, sometimes the reverse is true; the psychiatrist knowing he is under suspicion may lean backwards in his effort not to err on an organic case; while his colleague, on the basis of a negative physical examination, may make an incorrect diagnosis of neurosis in a case with an obscure organic disturbance.

There are no generally accepted and generally taught rules or criteria for the differential diagnosis between the psychogenic and the organic conditions. It may be of value both to the psychiatrist and the general practitioner to attempt to formulate some important generalizations that may aid in arriving at the correct differential diagnosis. It is too often found that the diagnosis of psychoneurosis is made on a basis of negative evidence, that is, because no organic pathology could be found to account for the patient's symptoms. It is generally accepted that proof by negative evidence is not fully conclusive. The fact that no organic pathology could be found cannot be accepted as proof that it does not exist, and that instead a psychoneurosis does exist. It would seem that diagnosis of psychoneurosis would be more satisfactory and certain if it were based as far as possible upon positive evidence, such as the discovery of adequately intense emotional conflict and of a close relationship between this conflict and the symptoms.

It is suggested that in all cases involving the differentiation between organic and psychogenic disturbance that it may be profitable to keep the following points in mind. Four illustrative cases are appended.

I. Absolutely complete physical and laboratory examinations must be utilized to rule out organic disease as far as possible. That, of course, is obvious. The converse of this is that no amount of psychogenic evidence, no matter how definite and positive, can, per se, eliminate the possibility of organic pathology. The latter can be ascertained only by methods of physical examination and not of mental examination. However, no matter how complete is the absence of evidence of organic pathology, still a diagnosis of neurosis based upon that fact alone is uncertain, since it rests upon negative evidence.

II. The next step, if one is to make the diagnosis of neurosis, is to obtain positive evidence that the patient is sick emotionally. Such evidence may take many forms. Usually, one can find a history of serious emotional

conflict or a series of frustrations, often self-induced. The patient has not been able to make an adequate adjustment in life. He may display distorted and exaggerated emotional attitudes, such as intense feelings of inferiority and inadequacy, guilt feelings, extreme passivity, or an ineffectual kind of aggressiveness that injures himself as well as others. It may be found that he has had severe inhibitions and paralyzing anxieties that have impaired his ability to function in the area of work and in the area of pleasure.

When these or other indications of a "sick personality" have been found, we may have positive evidence that the sick patient is neurotic, but this does not yet prove that the specific symptoms under question are of psychogenic origin.

III. More specific evidence that the symptoms in question are psychogenic would consist of the demonstration of a close relationship between the symptoms and the patient's emotional conflict, so that it becomes clear that the symptoms are a direct outgrowth and integral part of a psychoneurosis. Often it is a simple matter to uncover a temporal relationship between the onset of the neurotic symptom and an increase in the intensity of the patient's emotional conflict. The appearance of the symptom may occur during or following an acute emotional crisis, or may be temporally related to an incident that caused great emotional stress. The close relationship between the symptom and the emotional disturbance is more than a purely temporal one. The symptom is usually the outward expression of the emotional disturbance. It is an unconsciously determined attempt, usually unsuccessful, of the patient to do something to alleviate the distress of his emotional conflict.

The connection between the symptom and the patient's history of emotional conflict may be apparent on the surface, or it may be obscure, in which case considerable effort may be required to uncover it. However, when this has been correctly and successfully accomplished, the diagnosis of neurosis may be made with more confidence. If after a satisfactory and sufficiently diligent search such a relationship cannot be established, then the diagnosis of psychogenic disturbance should be viewed with suspicion, and the search for organic findings should be intensified.

A group of patients with whom it is often difficult to discuss emotional conflicts consists of those patients who have for a long time persisted in their hypochondriac complaints and who look, behave and talk like "neurotics." These patients are familiar to all physicians. They undoubtedly have neuroses. Often it is found that the patient has been treated by many physicians as an organic case, so that the patient's belief that he is organically sick has been strongly fortified. Nevertheless, it is surprisingly easy in many of these cases to gain insight into the emotional causes of the disturbance.* A constant danger in these cases is the possibility of the development of organic pathology in a patient who is a fixed hypochondriac (neurotic) of this type. This patient's description of the subjective sensations resulting from the organic process will be a "neurotic" description and the illness is likely to be used in a neurotic manner for neurotic gains. It is extremely important that these patients are not turned away without a careful physical examination merely because they are known to be neurotic. If anything, an even more careful physical examination is indicated.

IV. If the diagnosis remains uncertain, a therapeutic test may be of value. Generally, therapeutic tests are not accepted as absolute scientific proof. However, if the patient's emotional problems are really important in the presenting symptomatology, then it is likely that intensive therapy directed toward these problems should have some ameliorating effect upon the severity of the symptoms. On the other hand, intensive study of such problems may cause a temporary exacerbation of symptoms in the same way that palpation of an acute abdomen brings about increased localized pain in the effort to establish the

* This is usually possible if, as a first step, the physician is able to explain to the patient in simple, every-day language that while neurotic symptoms are not caused by physical sickness, still that does not mean that the symptoms are "imaginary"; that they are evidence of a very real sickness, but a different kind of sickness. It is advisable to follow this up with many simple examples of profound physical and physiological changes that may be brought about by acute emotional disturbances or shocks. A discussion of this kind is included in "Real and Imaginary Illness," by the writer, published by the New York State Committee on Mental Hygiene, 1940.

diagnosis. If these procedures do not produce confirmatory data it may be helpful to interrupt the intensive treatment for a period. If the symptom is of psychogenic origin, it may be found at the resumption of the treatment that the patient will present new and enlightening material concerning emotional difficulties and there may be a corresponding change in the severity of the symptomatology.

V. Of utmost importance, is the fact that many cases may have important organic and psychoneurotic disturbances at the same time. This statement may seem very elementary and commonplace, especially in view of the fact that in recent years psychosomatic interrelationships have received more and more importance in medicine. Unfortunately, one occasionally still finds physicians heatedly discussing such a case—one group arguing that it is organic, the other group that it is psychogenic. One should always remember that it may well be both.

Sometimes a latent neurosis is brought to the surface by intercurrent organic disease. It may be that the presenting symptomatology is a neurotically distorted intensified expression of an underlying, perhaps obscure, organic disease. Then the question arises whether the cure of the organic disease would be followed by a spontaneous improvement of the neurosis. It is important to ask oneself which actually causes more of the symptomatology and invalidism, organic disorder or the neurotic emotional reaction. From the practical standpoint, the physician wants to know which factor can be treated successfully—the organic, the psychogenic, or both. The physician is always interested in what approach is most likely to further the health and happiness of the patient. Sometimes organic illness is a result directly or indirectly of a long standing neurosis. For instance, it may be secondary to persistent neurotic reactions and symptoms, such as neurotically determined diet, fasting, vomiting or chronic constipation. One finds in the literature many discussions and case reports which demonstrate the importance of psychogenic etiological factors in such conditions as Grave's Disease, asthma, gastric ulcer, mucous colitis, hypertension, migraine, arthritis, anorexia nervosa. A purely organic illness may be even more directly the result of a patient's unconscious self-injuring masochistic tendencies, as in the example of a group of neurotic men who unfailingly manage to contract venereal disease despite a great anxiety about this possibility. In the same way, there are persons who seem to be repeatedly involved in accidents causing serious injury. In many of these persons it may be found that the carelessness which precipitated the accident was an expression of an underlying neurosis. Thus, even fracture cases may have an unexpected psychogenic etiology.

The following four cases are presented to demonstrate some of the points that have been raised in the above material.

Case 1—Mrs. A. was a married woman, age 43. She had been in a hospital for twelve days and upon discharge was referred to a psychiatric clinic with a final diagnosis of psychoneurosis. The discharge note stated that the presenting symptoms were pain in the left lower chest radiating to the left shoulder and down the left arm. These pains began three weeks prior to admission to the hospital. It was also stated that a hysterectomy had been performed six years previously, and that two years previously the patient was again in the hospital at which time a diagnosis was made of acute hemorrhagic cystitis and chronic ulcer of the bladder due to radium therapy. Biopsies from the bladder had shown no evidence of neoplasm.

During the recent hospital admission the complete physical and laboratory examinations revealed no organic cause for her complaints. A psychiatric consultation in the hospital indicated the presence of severe economic difficulties, but the psychiatrist was unable to discover any significant psychogenic component of the patient's complaint. Nevertheless, in view of the absence of organic findings, the medical staff decided that the patient's complaints were on a psychogenic basis.

The first interview in the clinic consisted of a detailed description of the patient's complaints. Her pains first began to occur in the left lower axilla one and a half years ago, then occurred about the precordium, and then the left breast. It appeared after excitement and was aggravated by work or talking. The pain in the left arm, of six week's duration (three weeks before hospital admission) usually began at the finger tips and slowly

extended up the ventral surface to the axilla and precordium. The very first involvement of the arm in the symptomatology was a "funny feeling" of the finger tips. This occurred in connection with a "heart attack" while out walking. She had been suffering from a "terrible pain" in the chest—usually at the epigastric region—and "pulling pain" at costal margins. Her heart beat rapidly, she became frightened and weak. She had to sit down, but did not lose consciousness.

The ensuing interviews dealt chiefly with the patient's symptoms and with her really distressing economic situation. Her family had subsisted on very little food, she was frequently on the verge of being evicted for non-payment of rent. After a few interviews, it was evident that the expected emotional conflicts and difficulties were not forthcoming. It was felt that if the patient's symptoms were of psychoneurotic origin, we should find significant emotional difficulties, other than the economic distress, which could be brought into relation to her symptoms. This did not occur and further interviews proved equally fruitless. Thus, there was very little positive evidence in favor of the diagnosis of psychoneurosis and the extended observation in the clinic was in agreement with the psychiatric consultation in the hospital. The pain gradually became worse, she began to hold her left forearm and fingers stiffly and a slight swelling appeared on the dorsum of the hand. She was referred back to the medical clinic where she was briefly seen and given medication. The next time she appeared in the psychiatric clinic with the skin over her left hand shiny and edematous and considerable pain upon flexion of the fingers. At this time the medical clinic referred her into the hospital for observation.

At the end of the hospital stay the discharge note included the following: "Zone of hyperesthesia was found about the middle of the left breast. There was motor weakness of all muscles of the left upper extremity with limitation in motion, especially abduction of the left shoulder. There was pain upon flexion of the fingers and slight swelling of intraphalangeal joints. The skin of the fingers and distal half of the left hand was smooth, somewhat firm, pale and not freely movable over the deep structures. There was very slight thickening over the skin of the left deltoid and left pectoral region.

"X-ray of the left hand showed very marked atrophy involving lower end of the radius, ulna, carpal bones, metacarpals and phalanges. Examination of the left shoulder failed to show any abnormality in the bones or soft tissues. Examination of the cervical spine showed moderate spondylitis of the 3rd, 4th, 5th and 6th cervical vertebrae; this change was most noted in the anterior portions of the bodies. X-ray of the chest showed no abnormality in the lungs and no evidence of a cervical rib.

"The dermatologists found no pathological skin manifestations and suggested that the changes were the result of previous inflammatory reaction of the skin itself. The neurological consultant considered the picture secondary to local joint changes. No foci of infection were found in the nose or throat. The evidence of this process being scleroderm were: previous edema, infiltration and tenderness of the deltoid; thickening of skin over left pectoral muscle; onset of symptoms in the fingertips of the right hand, making the disease bilateral; atrophy of bone and shortening in length and circumference of the entire left upper extremity, resembling the cases described by Osler.

"Patient was treated with sun-ray, massage, and diathermy to left upper extremity; some motion returned and the pain was lessened."

The discharge diagnosis was as follows: "Osteoarthritis of the Lumbar Vertebrae. Neurogenic atrophy of the bones of the left arm and forearm. Periarthritis of the left shoulder joint; and Scleroderma?"

Summary — After a completely negative physical and laboratory work-up in the hospital, this patient was referred to the clinic as a psychoneurotic despite the psychiatric consultation which had revealed that there was nothing to indicate any significant psychoneurotic component and, therefore, that the patient's complaints would probably prove to be of organic origin. Careful study in the clinic again failed to reveal psychogenetic source for the patient's symptoms. Eventually, definitely organic signs appeared and the patient was found to have a neurogenic atrophy of the bones of the left arm and forearm; periarthritis of the left shoulder joint and

possibly scleroderma. Thus the diagnosis of psychoneurosis, which had been based entirely on negative evidence, was found to be in error.

This case illustrates the first four of the above mentioned criteria, especially the third and fourth points.

Case II—Miss B.* was a single, intelligent woman, 30 years of age. She was noticeably tense and somewhat sharp in manner. For many years she had shared an apartment with another woman with whom she had a homosexual relationship. Her companion had recently begun to be attracted to another woman. Miss B. became extremely distressed and felt that there was no longer any reason to live. She made a serious suicidal attempt from which she was saved only by the accidental and unexpected appearance of her roommate. Shortly after her friend's infidelity, Miss B. began to have a persistent diarrhea. She went to several physicians for treatment. The first three physicians recognized immediately that she was obviously a tense, "neurotic" woman. Each of these physicians told her that she had "nerves," or that she was "neurotic" and that the diarrhea was the result of this nervous disturbance. The diagnosis of mucous colitis was made in each case. The fourth physician carried out complete physical and laboratory examinations, including stool examination. It was discovered that Miss B. had amoebic dysentery which was cured by appropriate treatment.

The patient continues to have profound emotional disturbance. She has made other suicidal attempts and may yet succeed in ending her life. She has persistently refused to accept psychiatric help. She remains an extremely sick person emotionally. Although this is true, and although she is still suicidal, the dysentery remains cured and she has gained weight.

Summary—In this case a woman who was extremely sick emotionally and who was obviously "neurotic" contracted amoebic dysentery. The first three physicians were so impressed by the neurotic element that they did not make every attempt to find an organic basis for the diarrhea. An organic cause was eventually discovered and the symptom was successfully treated. The patient remains a profoundly sick person emotionally.

This Case Illustrates points 1, 3 and 5

Case III—Mrs. C., a married woman, 36 years of age, complained of frequent dizziness, of eight years' duration, and of extreme nervousness. Dizziness, anxiety and fear of falling occurred especially when on stairs, or walking in the street and, occasionally, when attending motion pictures.

The patient was admitted to the psychiatric clinic from a medical clinic with the following note: "Hypertension 190/115. Extreme anxiety state. Very much in need of contraceptive advice. Kindly refer to gynecology clinic in conjunction with your study."

Eight years ago, patient found her two-year old son unconscious with his head stuck between the bars of his bed and his body hanging. She screamed for help. The boy was finally extracted and revived. Patient was tremendously upset. Two weeks later, while walking downstairs, patient was overtaken, for the first time, by dizziness and fear of falling. This dizziness and anxiety occurred at first when on stairs and later when walking on the street. After a while, anxiety and dizziness occurred when she was in the movies. In the course of years, the attacks of dizziness increased in frequency, so that in recent years they have been present practically all the time, and related to no specific situation.

At this point, during the first interview, the above material stimulated a few speculations. Thus far it was known that Mrs. C. had had great anxiety and dizziness for eight years and that it had begun shortly after an almost fatal accident to her son. It was quite understandable that she should have been extremely upset by the accident. However, it was striking that out of this emotional disturbance there gradually developed a symptom complex which still existed eight years later. It seemed that the threat of injury to the little boy had struck a vulnerable spot in the patient's psyche. Any guess at this stage was obviously hypothetical, but it was surmised that such a pathologically exaggerated and distorted reaction to the accident may have occurred as a result of a strong unconscious trend. Empirical experience suggested as a likely possibility an unconscious hostility to-

* This case is presented with the permission of Dr. Leonard Blumgart.

ward her son. It was hypothecated that the child might have been originally unwanted and rejected, in which case an actual danger which threatened him could be expected to strike deeply into the emotional life of the patient. Such a situation could stir up profound guilt feelings and bring forth some such distorted reaction as occurred. We also considered the possibility that if her unconscious hostility toward her son was so great, she might well have had a similar unconscious trend in relation to her husband. It was felt that if this were so, we should expect to find evidence of considerable hostility, either conscious or unconscious, toward her husband. It was expected that it would be found that in some way her relationship with her husband had become less satisfactory since the accident and the onset of her anxiety and dizziness. It was thought that this might turn out to be overtly true; or that the impairment to the relationship with her husband might be hidden or disguised—possibly the development of a sexual frigidity, or the aggravation of an existing frigidity, after the onset of the presenting symptoms.

Clearly, such suppositions and speculations could only be frankly hypothetical and experimental in nature. These thoughts, however, did occur in the course of the first half of the first interview. In the second half of the interview the patient spontaneously proceeded to confirm them.

We may now return to the interview to discover what further material the patient presented. She stated that she had been married for 15 years. She and her husband had been only slightly acquainted for two years before marriage. She married him during the war "on a dare, because there was nothing to lose and *if he were killed,* I would get $10,000." Patient stated that she had sex relations with her husband on the average of twice weekly. Coitus interruptus was the usual practice, although occasionally her husband was willing to take the necessary precautions so that interrupted intercourse was not necessary. Patient obtained gratification from intercourse and occasionally had orgasm despite the practice of coitus interruptus. Until the onset of the dizziness and anxiety she had desired intercourse and had reacted to it with genital sensations and emotional excitement. Since then she had "felt like a piece of wood," i.e., had been frigid. For the past eight years she had been indifferent to intercourse and had indulged in it mainly to gratify her husband.

The child involved in the accident *had actually been unwanted* by the patient. She had been impregnated "by accident." She hoped for an abortion and tried a few of the simpler well known methods. However, the pregnancy went on to full term, patient became reconciled to it, and her conscious reaction to the child became one of love. Patient's third pregnancy was also unwanted by her, but her husband impregnated her "for spite."

Thus we find that in a spontaneous and direct manner the patient confirmed all of our hypotheses. Her son actually was unwanted. She tried to end the pregnancy, i.e., to kill him in utero. This attitude was repressed from her consciousness when it became inevitable that she give birth to the child, and was replaced by a conscious attitude of love. Thus it is clear that unconscious hostility to the son had existed. Regarding the unconscious hostile trend toward her husband, we could easily detect a feeling of resentment against him when she spoke of her unwanted pregnancies, especially the last one. More striking was the fact that she had married him with the thought that he might get killed and she would then get $10,000. Also interesting, in view of the above speculations, was the fact that before the onset of the symptoms of dizziness and anxiety she enjoyed intercourse, while afterwards she was frigid.

After a few months of psychotherapy in the clinic her symptoms were somewhat ameliorated and her blood pressure was 140/95.

Summary—In the first interview it was possible to discover significant emotional strife in this case, the symptoms of which dated back eight years, and to establish a close relationship between the emotional conflict and the onset of the symptoms. Hypothetical speculations which establish such a relationship were made after the first half of the interview, and were confirmed by the data given during the second half of the interview. These speculations, while interesting, were not essential, since it was the data spontaneously

given by the patient that made clear the relationship between her emotional tension and onset of symptoms.

In this case, points two and three are illustrated.

Case IV—Mrs. D.* a married woman, age 32, was referred to a psychiatric clinic from a gastro-intestinal clinic with the report that physical examination and laboratory work was negative.

The patient's complaints were expressed in the psychiatric clinic as follows: "I have pains in my stomach. My stomach is loose and feels like it is going to drop and fall apart; my heart is still like something is holding it; it beats so fast at night that I wake up and scream and think it is going to stop. My body draws all over and stretches night and day. My eyes draw and are tight. My whole inside is very loose and weak and nervous."

Patient stated that the present complaints were of eight months' duration, beginning three months after a gall bladder operation. Further investigation revealed that she had been sick for ten years.

Present Illness — Ten years ago, typical severe gall bladder pains occurred, three weeks after the birth of her first baby. The pain persisted for three years until the birth of her second child, when it was replaced by a feeling of a lump in the epigastrium accompanied by belching. This persisted until the operation, which occurred eleven months prior to admission to the clinic. The preoperative diagnosis was chronic cholecystitis and colelithiasis. The operation consisted of cholecystectomy and appendectomy. The pathologist's diagnosis was: chronic appendicitis with partial obliteration including a foreign body giant cell reaction; chronic cholecystitis with cholestrosis, cholelithiasis.

For three months after the operation the patient enjoyed unusual health and well being. Then she began to have stomach pains—"a drawing pain like an abscess." She thought that she had abscesses all over her stomach. This feeling persisted, also the feeling of looseness and shaking of the stomach. Only when she lay down alone and rested "with no one nagging," did she feel well. She was easily annoyed by the children and was made much worse by any excitement. She felt peaceful only when her children and husband went away and left her alone.

Marital History—After a courtship of two years, patient was married, at the age of 21, to her husband, who was six years older. Patient stated that during the first several months of marriage she was intensely passionate, of which she was ashamed. She enjoyed intercourse and obtained gratification, but did not wish to have children. However, she was advised by a doctor not to practice contraception. She accepted this advice, and as a result she had a baby ten months later, against her own desire. Since that time she had been frigid and had had intercourse only to accommodate her husband. The onset of her epigastric pain occurred three weeks after her first delivery. She lost weight and became thin. She was told nothing was wrong physically, and after three years was advised that if she had a second baby she would be relieved of her complaints. She had the second baby, also against her own desire.

Patient spoke of the terrific anxiety associated with the birth of her babies. She had tremendous fear of death during the first childbirth, which was instrumental. During the second delivery she was also fearful, but hoped for the improvement of her nervous condition, which had been promised as a result of having the second baby.

Early Psychosexual History — Patient was brought up in a rural area in an atmosphere of tremendous repression. When her first menstrual period occurred she knew nothing about menstruation and was too ashamed to discuss it with her mother. She received her information from a girl friend, 11 years old. At about the same age she told her mother that a girl friend informed her the mother must sleep with the father in order to have a baby. Her mother scolded her, hit her, told her not to speak to that girl and that it was not necessary for the mother to sleep with the father as the baby came out of the mother's head. When the patient's first attempt to be confidential with her mother brought forth such a harsh rebuke and de-

* The fact that the four cases presented are women should not be accepted as confirmation of the misapprehension, still entertained by many, that "all neurotics are women" or "all women are neurotics." The one-sided distribution as to sex is purely fortuitous. These cases were chosen because they happened to demonstrate best the specific points developed by the writer.

liberate misinformation, she withdrew from any further attempts at understanding the problems of sex and childbirth. Instead, she entertained incorrect and frightening fantasies concerning this process, believing that the abdomen opened up in the midline and the baby was born through such an opening. At the age of 17 patient was more correctly informed about sexual intercourse and childbirth. The information about childbirth seemed incredible and made a tremendous impression on her. For weeks afterwards she pondered upon how a baby could come through so small an opening, and the more she pondered the greater grew her anxiety about childbirth. The importance of this intense anxiety becomes apparent when it is considered in conjunction with her marital history and the history of the development of her symptomatology.

Discussion and Summary—In this case, it was clear that there had been an organic condition, chronic cholecystitis with cholelithiasis, and that afterwards there may have been some postoperative adhesions that could have been considered an organic basis for her recent complaints. It was equally clear, however, that she had experienced intense emotional conflict; that much of her conflict and anxieties had revolved around the question of pregnancy and childbirth; and it seemed that the development of her illness had been intimately associated with her own pregnancies and childbirth. She had, in fact, been advised to undergo her second pregnancy in order to eliminate pains which were then considered to be of "nervous" origin. Apparently, this was done either in ignorance of the existence of the organic condition, or because the physician was unaware that there was available a more rational and satisfactory method of handling the neurotic element. Naturally, the maneuver that was attempted was unsuccessful. Her symptoms before the operation were probably of organic origin, but were intensified and elaborated by the psychogenic emotional factors, while after the operation they seem to have been largely of psychogenic origin.

After considerable investigation in the clinic it was ascertained that her abdominal pains were for the most part associated with her bowel movements, but in a most peculiar manner. She had great epigastric pain not before or during defecation, but after it. She was able to have one bowel movement per day without pain, but each one after that was followed by excruciating abdominal pain. The fact that she could have one movement each 24 hours without pain, but that each one above that number caused pain, certainly did not speak for an organic basis for that pain.

Thus, in this case, we find that both organic and psychogenic causes have been coexisting and that when the patient was surgically cured of her chronically inflamed gall bladder and appendicitis, she remained sick. Her emotional conflicts remained.

In this case, points two, three and five were illustrated.

Summary and Conclusions

The diagnosis and treatment of a neurotic person is one of the most frequent problems in the practice of medicine. In this paper we have discussed the differential diagnosis of psychogenic and organic disturbances. It is suggested that the following five points may be of value in the management of this problem:

1. The diagnosis of neurosis should not be made on the basis of negative evidence alone, that is, the absence of organic pathology.
2. If the diagnosis of neurosis is to be considered as a possibility in a specific case, positive evidence should be found; that is, evidence that the patient is sick emotionally.
3. In a neurosis, a close relationship should be found between the symptoms and the patient's emotional disturbance; in fact, the symptoms are a direct outgrowth of the emotional disturbance.
4. The diagnosis may be tested by a form of therapeutic test.
5. Cases should not be considered as being either psychogenic or somatogenic in origin. Each case should be approached as a psychosomatic problem.

49 East 96th Street.

ADDRESSES

On Wednesday, September 18, Dr. David Rapaport of the Menninger Clinic, addressed the Medical and Social Service Staff at the Eloise Hospital, Michigan, on *The Rorschach Test and Other Projective Tests.*

The reception of this paper was enthusiastic, because of the clarified conciseness of its presentation, and easy, understandable interpretation.

Dr. Rapaport has been visiting Eloise Hospital for a brief study period with Dr. Milton H. Erickson, Director of Research and Psychiatric Teaching, of Eloise Hospital.

Dr. Karl A. Menninger, chief-of-staff of the Menninger Clinic, spoke to the California Academy of Medicine, San Francisco, September 14, and to the Tarrant County Medical Society, Fort Worth, September 24, on *A Scientific Study of the Personality From the Medical Standpoint.* He also spoke to several other medical groups in the course of his trip.

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DR. PAUL L. SCHROEDER JOINS EDITORIAL STAFF

It is with a great deal of pleasure that we can announce that Dr. Paul Louis Schroeder of Chicago has joined our editorial staff.

Dr. Schroeder is particularly well known to neurologists and psychiatrists of America. He is a graduate of the University of Illinois, 1919, and has been interested in psychiatry since that time, serving first as a junior physician in the Peoria State Hospital, and later as psychiatrist in the Veterans' Bureau. Since that time he has been particularly interested in criminology, serving as psychiatrist, 1922-24, in the Division of Criminology of the Lincoln State School and Colony at Lincoln, Illinois, and since 1930 has been State Criminologist of Illinois.

From 1924-1930 he was psychiatrist of the Institute for Juvenile Research, and is at present director of the institute. He is also professor and head of the Department of Criminology of the College of Medicine, University of Illinois. He is a member of the special neurological and psychiatric societies in Chicago.